

Notice of Allowability

Application No.

10/686,892

Examiner

S. V. Clark

Applicant(s)

BATISH ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the telephone interview on September 14, 2004.
2. ☒ The allowed claim(s) is/are 1-35.
3. ☒ The drawings filed on 10-16-03 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 10-16-03
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

S. V. Clark
Primary Examiner
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An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Jacques Etkowitz on September 14, 2004.

Please rewrite the claims 1, 18, 20, 21, 22, 30, 34, and 35 as shown below.

1. A method of packaging a semiconductor device including at least one semiconductor element, a carrier, and a plurality of conductors providing interconnection between the at least one semiconductor element and the carrier, the method comprising the steps of:

applying an insulative material to at least a portion of the semiconductor device and the conductors, the insulative material including insulative particles having a diameter smaller than a gap between adjacent ones of the conductors, thereby reducing the potential for short circuiting between the adjacent conductors; and

curing the insulative material.

18. The method of claim 1 wherein said applying step includes applying the insulative material to the at least one semiconductor element at a substantially central portion thereof, such that the insulative material disperses from the at least one semiconductor element onto the plurality of conductors.

20. The method of claim 1 further comprising the step of:

providing a period of time between 2 and 50 seconds for the insulative material to flow prior to said curing step, the period of time being selected based on at least one of a size of the semiconductor device, a temperature of the

semiconductor device, a temperature of the insulative material during said step of applying, and a density of the conductors providing interconnection between the at least one semiconductor element and the carrier.

21. The method of claim 1 further comprising the step of:

providing a period of time between 7 and 25 seconds for the insulative material to flow prior to said curing step, the period of time being selected based on at least one of a size of the semiconductor device, a temperature of the semiconductor device, a temperature of the insulative material during said step of applying, and a density of the conductors providing interconnection between the at least one semiconductor element and the carrier.

22. A semiconductor device comprising:

at least one semiconductor element;

a carrier for supporting said at least one semiconductor element;

a plurality of conductors providing interconnection between said at least one semiconductor element and said carrier; and

an insulative material including insulative particles having a diameter smaller than a gap between adjacent ones of said plurality of conductors, said insulative material covering at least a portion of said plurality of conductors and thereby reducing the potential for short circuiting between the adjacent conductors.

30. The semiconductor device of claim 22 further comprising an encapsulation layer encapsulating said at least one semiconductor element, said carrier, said plurality of conductors, and said insulative material.

34. The semiconductor device of claim 24 wherein a period of time between 2 and 50 seconds is provided for said insulative material to flow prior to curing said insulative material, the period of time being selected based on at least one of a size of said semiconductor device, a temperature of said semiconductor device, a temperature of said insulative material during application to said portion of said plurality of conductors, and a density of said conductors providing interconnection between said at least one semiconductor element and said carrier.

35. The semiconductor device of claim 24 wherein a period of time between 7 and 25 seconds is provided for said insulative material to flow prior to curing said insulative material, the period of time being selected based on at least one of a size of said semiconductor device, a temperature of said semiconductor device, a temperature of said insulative material during application to said portion of said plurality of conductors, and a density of said conductors providing interconnection between said at least one semiconductor element and said carrier.

The claims have been rewritten as shown above as agreed upon in the proposed claim amendments discussed on September 14, 2004.

The following is an examiner's statement of reasons for allowance: The conductor arrangement recited in the claims having the insulative materials with particles between adjacent conductors appears to be only taught with limited detail in

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the Hmeil literature. The declaration under 37 C.F.R. 1.131 filed September 15, 2004 along with supporting documentation had been entered and appears to be proper to over come any conflict with the date of said literature.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication should be directed to S. V. Clark at telephone number (571) 272-1725.



S. V. Clark
Primary Examiner
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September 18, 2004